Worldwide Engineering, Environmental, Construction, and IT Services

Statement of Qualifications

CRA Corporate Profile

CONESTOGA-ROVERS & ASSOCIATES

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1.0 CORPORATE OVERVIEW

Conestoga-Rovers & Associates (CRA) provides comprehensive engineering, environmental consulting, construction, and information technology (IT) services. CRA employs 3,000 staff in over 90 offices, working on projects around the world. Since its establishment in 1976, CRA has provided practical, innovative, and effective services in such areas as environmental site assessment and remediation; facility decommissioning and demolition; regulatory compliance and permitting; environmental health and safety; solid and hazardous waste management; air quality management; information management; and municipal infrastructure planning, design, and construction.

Because CRA is a technical service organization, our employees are our most valuable asset. CRA's diversified staff is committed to providing high-quality services through a team approach, hands-on experience, and technical expertise. Over the years, we have developed a reputation for delivering technically sound solutions on time and within the established budget.

Corporate responsibility and accountability, technical excellence, and a commitment to consistent, superior services have proven to be a major factor in CRA's outstanding, worldwide reputation, one that will enable the corporation to manage a future of continued growth and the provision of expert services to its clients. It is our common goal to meet and exceed the expectations of our clients in a responsive, safe, and cost-effective manner. We have built a solid reputation over the years based on hard work and discipline. Our commitment to client satisfaction and responsiveness is a cornerstone of our organizational and project management philosophy, which embraces a flat, non-hierarchical structure in which the Principals and senior management actively direct our project work and interaction with clients.

As a testament to the company's stability and reputation, a high percentage of CRA's ongoing work is with repeat clients. According to our ISO 9001:2008 client feedback survey results received to date, over 97 percent of respondents have indicated that CRA's overall performance was good or excellent, and over 97 percent have indicated that CRA met or exceeded their expectations.

2.0 CORPORATE SERVICES

CRA's services have evolved and grown through the broad spectrum of needs that have been identified by our clients. Our general areas of service are described in the following sections.

2.1 ENGINEERING

CRA's diversified team of engineers offers a wealth of experience in developing both traditional and innovative solutions to engineering projects. The company has more than 30 years of experience in managing a full range of engineering projects from very simple single disciplinary projects, to complex, multi-disciplinary, multi-million-dollar projects. Design services personnel have the necessary core expertise from both the technical/theoretical and practical/implementation sides to fully meet the specific requirements of a project. We offer responsive and cost-effective engineering services ranging from conceptual design to the development of plans and specifications, contract administration, construction supervision, and operations.

An overview of our engineering services is provided below.

2.1.1 CIVIL ENGINEERING

CRA's civil engineering services range from planning, design, surveying, and contract management to field construction services. The following areas are those in which CRA has the experience to help clients realize efficiencies in both construction time and capital costs:

- Water distribution, including infrastructure needs studies and assessments
- Supervisory Control and Data Acquisition (SCADA) Systems
- Water efficiency, conservation programs, and water supply master plans
- Sewage collection including municipal and private sanitary systems
- Pump stations, forcemains, and inflow/infiltration studies
- Sewage treatment plant design, troubleshooting, and efficiency studies
- Storm drainage and stormwater management
- Urban, rural, and agricultural drainage systems
- Local and arterial roadwork experience

- Bridge design, assessment, and rehabilitation
- Traffic impact assessments and pavement design
- Commercial and institutional site development
- Industrial and residential land development and subdivisions

2.1.2 ELECTRICAL ENGINEERING

CRA's electrical and instrumentation personnel have extensive experience in the design, installation, and evaluation of electrical and process control systems for industrial, commercial, and manufacturing facilities. We can offer design and procurement services and determine the impact of plant modifications and expansions to existing facilities. Major services include:

- Electrical system design criteria
- Equipment and material procurement specifications
- Installation guidelines, specifications, and scopes
- Standby power generating systems including parallel switchgear
- Motors and motor controls (electromechanical and solid state)
- Wiring (cable tray, conduit, and cable) systems
- Evaluation and design for control systems to improve process control and efficiency
- PLC and HMI programming
- Remote telemetry and automation

2.1.3 GEOTECHNICAL ENGINEERING

CRA provides comprehensive geotechnical engineering investigation and design services for shallow and deep foundations, earthwork and embankment designs, and on-site quality control and construction supervision services. Specific areas of expertise include:

- Geotechnical investigations to identify soil, rock, and groundwater conditions
- Behavior evaluations of conventional foundations, piles, caissons, temporary and permanent earth-retaining structures, supported slopes, landfill, earth dikes, raft foundations, highways, roads, large diameter culverts, wharves, and storage tanks

- Instrumentation and analysis of foundations, earth-retaining structures, and embankments
- Expertise in special construction methods
- Failure analysis and remediation scenarios for retaining walls, slopes, and shorelines
- Geotechnical testing laboratory
- Cost analysis, budget estimates, management, and design of earthworks
- Vibration and blasting control
- Flexible and rigid pavement design and rehabilitation

2.1.4 PLANT ENGINEERING

CRA personnel have the experience and expertise to provide our clients with the necessary support for major facility expansions, as well as smaller plant modifications. We perform plant engineering projects ranging from 1-day troubleshooting to multi-million-dollar turnkey expansions, on time and within budget. Our personnel have the experience to design, install, and document process improvements. In addition, specialists can be placed on site on an hourly basis to fulfill our clients' short-term needs. Major areas of service include:

- Preliminary studies and appropriate grade estimates
- Process engineering design
- Process evaluation and optimization
- Engineering flowsheets (P&ID and mass balances)
- Mechanical, electrical, civil, and structural engineering projects
- Utilities generation and distribution
- Material handling system, mechanical vessel, and equipment integrity assessment
- HVAC design
- Electrical substations, switchgears, motors, and motor controls
- Evaluation and troubleshooting of existing installations
- Instrumentation engineering - specification and loop design
- PLC/HMI programming
- Building design, containment structures, geotechnical analysis, and design
- CADD expertise
- Safety and industrial hygiene

- Total project management including purchasing, expediting, field construction supervision, startup support, and troubleshooting assistance

2.1.5 WATER/WASTEWATER TREATMENT

CRA offers comprehensive services for the design, construction, and operation of cost-effective water and wastewater treatment facilities. These services are provided to optimize, upgrade, or expand existing industrial, municipal, or remedial treatment facilities, and to design new treatment facilities for specific waste streams. CRA's capabilities and expertise in wastewater treatment include:

- Conventional and advanced biological systems
- Biological nutrient removal
- Pre-treatment of sewer discharges
- Treatment of contaminated groundwater
- Landfill leachate treatment
- Characterization and treatability studies
- In-house laboratory support
- Process audits and optimization
- Water conservation and wastewater minimization
- Sludge and other residuals management
- Plant commissioning and operator training

2.2 ENVIRONMENTAL

Since CRA's involvement in the Love Canal project in Niagara Falls, New York beginning in the late 1970s, we have established a strong reputation for excellence in the environmental field. Through a commitment to environmental responsibility, our environmental expertise is applied to effectively address historical contamination problems, as well as to prevent the creation of new problems.

As environmental regulations have developed and innovative technologies have evolved, CRA has always respected its clients' mandate of cost-effective environmental responsibility with careful regard for protection of the public and the environment. Our environmental services incorporate the assessment and cleanup of historical

contamination and the planning and design of new facilities to achieve and maintain environmental compliance with due regard for sustainability. An overview of these services is provided below.

2.2.1 AIR QUALITY MANAGEMENT

CRA has thorough and substantial experience in complying with air quality regulations. A core group of professionals is dedicated to assisting our clients with air quality management services in the following major areas:

- Emission inventories
- Emission control systems
- Permitting
- Ambient air quality and air toxic standards
- Source testing and monitoring programs
- Compliance auditing
- Environmental impact analysis
- Accidental release and risk management programs
- Indoor air and industrial hygiene
- Odor assessments
- Noise assessments

2.2.2 ENVIRONMENTAL SITE ASSESSMENT/DUE DILIGENCE

All phases of Environmental Site Assessments (ESAs), Environmental Management Systems (EMSs), property audits, and multi-media compliance audits are conducted by CRA. CRA's specialists are knowledgeable on and experienced with applicable environmental laws and regulations. Typical assessment, compliance, and management system services include:

- Phase I and Phase II ESAs in accordance with applicable standards
- Environmental Compliance Audits (ECAs)
- Development and implementation of Environmental Management Systems (ISO 14000)
- Occupational safety and health audits

- Sampling and monitoring programs
- Multi-media regulatory compliance evaluations
- Waste handling assessments
- Building hazardous materials assessments

2.2.3 ENVIRONMENTAL REMEDIATION

CRA provides extensive services in the assessment, remedial plan development, and remediation of contaminated sites. Our staff has up-to-date knowledge of applicable environmental laws and regulations. They are experienced in applying engineering principles and specialty skills to develop solutions for a range of contaminated site conditions. CRA's services in this area include:

- Comprehensive site investigation programs
- Remedial alternative evaluations/feasibility studies
- Remedial design, treatability, and/or pilot studies, and implementation
- Decommissioning of facilities
- Brownfield redevelopment
- Preparation of hazardous waste facility permit applications
- Multi-media sampling and analytical support
- Environmental risk assessments
- Development of cleanup criteria

2.2.4 FACILITY DECOMMISSIONING AND DEMOLITION

CRA provides services for all phases of facility decommissioning and demolition, including preliminary site evaluations, building and subsurface (soil, water, utilities, and buried waste) investigations, management of environmental remediation, decommissioning, demolition, and property restoration activities. CRA professionals have decommissioned over 1 billion square feet of industrial/commercial buildings. CRA's facility decommissioning and demolition services include:

- Hazardous material (asbestos, lead, mercury, etc.) surveying and abatement planning
- Aboveground and underground storage tank closure

- Structural integrity audits
- Redevelopment of idled and/or abandoned industrial properties (Brownfield sites)
- Utility and process system audits
- Decommissioning and demolition scheduling and supervision

2.2.5 LABORATORY AND TREATABILITY TESTING

CRA operates a comprehensive environmental testing and treatability study facility in Niagara Falls, New York. This facility includes a laboratory for general analytical and chemical treatment testing, specialized areas dedicated for working with toxic and hazardous materials, clean rooms for biological treatment simulation and fermentation support, and a scale-up area for process development and pilot testing. These laboratories strongly complement CRA's environmental engineering and industrial hygiene expertise, particularly in the assessment, management, and remediation of environmental microbiology problems related to drinking water supply and treatment systems, multi-media remediation programs, wastewater treatment systems, air quality, pathogen assessment, and mold contamination. The laboratory provides technical experts and maintains state-of-the-art equipment to support the following services:

- Air quality assessment (bio-aerosol, depositional, and liquid impinger sampling)
- Biofouling and pathogen detection, identification, and quantification
- Drinking water, surface water, and groundwater quality evaluation
- Industrial and municipal wastewater treatment evaluation
- Water disinfection system efficacy testing
- Biological system failure assessment and operation optimization
- Biological treatment simulation utilizing soil microorganisms, soil columns, and slurry bioreactors
- Computerized respirometry testing for biological systems degradation evaluation
- Soil vapor extraction/air sparging evaluation and modeling
- Sludge filtration testing
- Anaerobic chamber for denitrification testing
- Chemical dechlorination process scale-up
- Solvent extraction screening
- Soil washing evaluation

- Chemical fixation, solidification, and stabilization screening
- Groundwater treatability testing
- Methods development for non-standard analyses
- PCB and dioxin/furan congener profiling
- Waste characterization

2.2.6 UNDERGROUND STORAGE TANK MANAGEMENT

CRA has extensive experience in the management of Underground Storage Tanks (USTs). CRA has investigated thousands of UST sites and we are able to assist our clients with all aspects of effectively managing UST issues, including the design and permitting of new installations. Services have ranged from simple removal actions to comprehensive site-wide soil and/or groundwater investigation and remediation. CRA's general UST services include:

- Permitting
- Emergency response
- Site investigation and containment assessments
- Risk-based corrective action evaluations
- Corrective action plans/closures
- Full design and construction capabilities
- Operation and maintenance of remedial systems
- Trust/indemnity fund reimbursement assistance

2.2.7 INDUSTRIAL HYGIENE AND SAFETY

CRA's safety and industrial hygiene specialists have a broad base of experience in all types of industrial, private, and environmental applications. CRA provides the following safety and industrial hygiene services:

- Assessment of employee exposure to hazardous substances
- WHMIS and employee right-to-know training
- OSHA worker training programs (40-hour, supervisory, and refresher)
- Respirator fit testing and training

- Accident and injury investigations
- Litigation support
- Health and safety plans and site safety officer services
- Health and safety compliance audits
- Material safety data sheet program management
- Noise evaluations and program management
- Asbestos investigations and program management
- Indoor air quality investigations

2.2.8 REGULATORY COMPLIANCE, PERMITTING, AND AUDITING

CRA has developed a long-standing reputation for helping its clients meet or exceed environmental regulatory requirements. Our professionals are familiar with major compliance and permitting issues at all regulatory levels across North America and throughout an expanding international market. Services include:

- Regulatory compliance analysis
- Comprehensive environmental permitting
- Facility compliance audits
- Safety and industrial hygiene programs
- Compliance monitoring and reporting

2.2.9 SOLID WASTE MANAGEMENT

CRA has significant experience in all areas of solid waste management. CRA's involvement includes landfill siting and approvals assistance, participation in legal proceedings regarding approvals and preparation of conceptual and detailed designs of landfills for public and private sector clients. Several senior CRA professionals were the primary authors of a textbook (Solid Waste Landfill Engineering and Design, Prentice Hall, 1995), which is used by academia and industry as a teaching tool. CRA has also developed guidance documents in the area of landfill gas management for Environment Canada and the World Bank. CRA's specific areas of expertise in solid waste management include:

- Landfill design and operation

- Waste management planning and landfill site location
- Leachate collection and treatment systems
- Landfill gas recovery and utilization
- Evaluation of landfill gas and leachate migration
- Odor, noise, and air emission assessments and abatement
- Landfill closure plans
- Design and implementation of monitoring plans

2.3 CONSTRUCTION

Engineering design and construction services are provided for a variety of commercial, industrial, and municipal projects. CRA provides the full scope of possible project delivery methods including advisory, conventional construction management, design-build, design-build-operate, and design-build-own-operate. A key to the successful implementation of any construction project is the proper management of resources and the sharing of expertise between the engineering/environmental design and construction fields. CRA has developed a strong group of highly qualified personnel who have the unique capability to blend the technical design expertise with practical constructability issues, to meet the goals of our clients. Our construction experience is further described below.

2.3.1 MUNICIPAL INFRASTRUCTURE

CRA offers a complete range of services to municipal, commercial, industrial, and development clients for the engineering of new or the rehabilitation of existing infrastructure works. CRA's infrastructure services include:

- Design/rehabilitation of storm and sanitary sewer systems
- Sewer inflow/infiltration investigations
- Water storage and distribution systems
- Water and wastewater treatment
- Design of bridges and roads
- Rehabilitation/reconstruction of existing road systems
- Trenchless technologies for replacement of services
- Functional planning and road studies

- Intersection improvements
- Industrial/residential subdivision design
- Site surveys and drainage plans
- Stormwater management

2.3.2 REMEDIATION SYSTEMS

CRA offers extensive expertise in the design, implementation, and management of environmental remediation programs. CRA has successfully conducted over 5,000 environmental cleanups of various sizes and complexities under voluntary actions, cooperative actions with environmental agencies, and enforcement actions. CRA selects and evaluates potentially applicable remedial alternatives that meet appropriate cleanup objectives. Work plans and designs are prepared and negotiated, as required, with the appropriate environmental agencies. CRA's guiding principle on any project is to develop and implement the most efficient and cost-effective remedial solution to an environmental situation. CRA's site remediation services include:

- Groundwater extraction, process design, and treatment systems
- In situ treatment using biological or physical systems
- Hydraulic containment/barrier walls
- Capping/containment systems
- Waste solidification/stabilization
- Excavation and handling of contaminated soils and sludges
- Thermal soil treatment (high and low temperature)
- Soil vapor extraction and treatment
- Dual phase treatment
- Air sparging and biosparging
- Bioremediation and land farming
- Intrinsic remediation
- Drummed waste management

2.3.3 OPERATION AND MAINTENANCE

CRA provides a full range of services related to operation and maintenance of various treatment and remediation systems. These services range from design, construction, and on-site operation of treatment systems to reporting and emergency response activities. Operation and maintenance services are provided by CRA for the following:

- Groundwater remediation treatment systems
- Municipal water and wastewater treatment systems
- Landfill leachate treatment systems
- Landfill gas treatment and utilization systems
- Soil vapor extraction and air sparging systems
- Bioremediation systems
- General site maintenance activities

2.4 INFORMATION TECHNOLOGY SERVICES

CRA's eSolutions Group integrates many of the information technology (IT)-related services offered by CRA such as environmental data management, geographic information systems, environmental visualization, software development, and electronic graphics design. Our main objective is to provide unique and user-friendly electronic data handling, data access, and data communication solutions for our clients.

Our professional staff offers expertise in a number of key information technology areas including:

- Environmental data management
- Remote sensing
- Geographic Information Systems (GIS)
- e:DAT (Electronic Data Access Tool)
- e:DAT ER (Emergency Response)
- Waste Manager
- Three-dimensional visualization
- Software development
- Graphics design

- Internet/Intranet services

2.4.1 ENVIRONMENTAL DATA MANAGEMENT

One of the most important capabilities developed by CRA has been the effective management of environmental data. Our solid reputation as an environmental consulting firm is based on our ability to maintain accurate databases of information collected for our clients. As these collections grow over time, it is increasingly important to establish effective data management strategies for the future. These strategies should accommodate the growing importance of sharing information with large numbers of interested parties. Technologies such as Geographic Information Systems (GIS) and the Internet play an important role in the development of an environmental data management strategy.

When managing environmental data for our clients, CRA focuses on several key objectives including efficiency, effectiveness, and accessibility. We have addressed these objectives when developing customized environmental data management systems for our clients. We also offer automated data verification and data validation of electronic data deliverables from the laboratories. CRA also integrates the data management process with other professional services including computer simulation and three-dimensional visualization.

2.4.2 REMOTE SENSING

CRA's Geographic Information Systems (GIS) specialists can integrate a wide variety of remotely sensed imagery into projects using state-of-the-art digital image processing systems. Aerial photography and satellite images can be used to bring ordinary lines and points on a map to life. Data users can visualize project sites more easily through the use of a digital image backdrop.

Digital images can be analyzed and used in a number of applications. For example, infrared images can show changes in the state of vegetation that are not apparent with regular photography, and thermal imaging can be used to pinpoint underground activity. These techniques are part of the IT Services suite of remote sensing capabilities.

2.4.3 GEOGRAPHIC INFORMATION SYSTEMS (GIS)

GIS provides powerful tools that integrate maps with databases. Our GIS specialists are experienced with most popular platforms including ArcGIS□, ArcInfo□, ArcView□, GeoMedia□, MapInfo□, and MapObjects□. We apply GIS and other technologies in disciplines including environmental site management, water resources, hydrogeology, remote sensing, and municipal infrastructure and facilities management.

GIS provides a natural framework for combining environmental databases with maps and aerial photographs. Our GIS specialists have developed customized applications integrating multiple types of information collected in the field to make it easy to access and analyze environmental databases with an intuitive graphical environment.

Much of CRA's land surveying is now conducted using Global Positioning Systems (GPS) technology. Our GPS capabilities allow us to accurately locate site features and incorporate this information directly into a GIS.

2.4.4 THREE-DIMENSIONAL VISUALIZATION

Three-dimensional visualization is effective for understanding and communicating complex environmental systems. Using state-of-the-art software tools, CRA has been successful at using three-dimensional visualization techniques for various types of environmental scenarios including:

- Topographic relief and digital aerial photography
- Above-ground facilities including buildings and storage areas
- Below-ground facilities including underground storage tanks and sewers
- Three-dimensional geologic models including block and fence diagrams
- Groundwater flow regimes
- Groundwater plumes and changes in groundwater chemistry over time

2.4.5 E:DAT□

CRA's Electronic Data Access Tool (e:DAT□) has been developed based on powerful GIS (Geographic Information System) and database management concepts. e:DAT provides quick and easy access to site maps and environmental databases and is a stand-alone data access tool requiring no additional database or GIS software.

This software package integrates data from site maps, photos, reports, and analytical chemistry. Modeling and 3-D visualization results can also be incorporated. e:DAT facilitates project meetings and presentations by providing quick and easy access to various views of maps, photos, and analytical data.

Another product, e:DAT Web, provides an intuitive approach for accessing and sharing environmental data over the Internet. This software package offers superior flexibility, enabling the integration of geographic information with all types of tabular and visual electronic information. e:DAT Web can be used to share environmental monitoring data among project teams and regulatory agencies or to provide public access via a user-friendly website.

2.4.6 WASTE MANAGER

CRA's Waste Manager software has been developed to track and report solid and hazardous waste information, shipments, and disposition. This custom software can be implemented to meet the needs of single or multiple facility operations. Waste Manager can be accessed on a single computer or can be configured to run on a local area network (LAN) or an Intranet.

CRA's Waste Manager offers the following features:

- Maintains detailed data on individual facility wastes, shipments, transporters, shippers, disposers, and container storage
- Provides disposal breakdowns by company, facility production unit/department, and waste type
- Handles various waste categories, e.g., solid, hazardous, recycled, non-hazardous oilfield waste, commercial, and other user-defined categories
- Produces date-sensitive alerts for items such as stored wastes and expiring approvals
- Generates various waste summary and status reports
- Supports EPA Biennial Reporting System (BRS)
- Maintains multi-level user access security
- Exports data for use with other data management systems

Other modules that can be incorporated in the Waste Manager software, as needed, include Container Management, Manifest Printing, and Chemical Tracking modules.

2.4.7 SOFTWARE DEVELOPMENT

CRA offers a wide range of custom software development capabilities. We specialize in the development of information management tools for Windows environments and the Internet. In many cases, commercial "off-the-shelf" software programs do not readily meet all our clients' requirements. Whenever possible, we extend the capabilities of commercial products by developing powerful new tools and features.

CRA's eSolutions Group offers the expertise to develop state-of-the-art software in the following areas:

Database Management. CRA develops custom database management applications for our clients using Microsoft Access□, Visual FoxPro□, and Visual Basic□. These applications have been developed to meet various needs including industrial waste management, environmental monitoring data management, and environmental health and safety.

Geographic Information Systems (GIS). GIS has become an invaluable spatial information management and analysis tool useful for many applications including environmental management, computer simulation, natural resources planning and management, water resources management, and infrastructure management. Our skilled GIS specialists and programmers can provide custom solutions using most popular technologies including ArcView□, Arc/Info□, and MapObjects□.

Internet/World Wide Web. CRA can provide database management and GIS solutions on the Internet using industry-leading technologies such as MapObjects□ Internet Map Server□, Microsoft IIS□, Microsoft Access□, HTML, Java, and Active Server Pages (ASP).

SCADA (Supervisory Control and Data Acquisition). CRA provides its clients with state-of-the-art SCADA solutions. CRA's skilled programming specialists can provide custom solutions using popular SCADA technologies including Wonderware, FIX Dynamics, RSView, and Plantworks.

2.4.8 GRAPHIC DESIGN

CRA's has a staff of talented graphic designers who can provide unique design solutions for any project. Our graphic designers utilize the latest software to create outstanding communication materials for our clients. Whether traditional print media or contemporary multimedia presentation materials are required, we offer the technical expertise and understanding of the environmental and engineering fields to create designs that reflect the scope and complexities of the project.

Our professional staff offers the ability to produce the following products:

- Traditional print media and graphic design
- Interactive multimedia presentations
- Animation
- Graphical interfaces
- Website design and maintenance
- Interactive flash websites
- In-house video, editing, and compositing
- Traditional/digital photography
- Scanning and photo editing
- 3-D design

2.4.9 INTERNET/INTRANET SERVICES

Internet technologies have become the predominant means for sharing information with others. CRA has continued to guide our clients by harnessing the benefits of the World Wide Web. CRA's diverse range of applications and custom solutions can improve efficiency in project management and simplify daily activities. CRA's Internet services range from designing and maintaining a simple website to developing state-of-the-art applications that provide integrated database and mapping capabilities. Our full range of Internet services includes:

- Web page design
- Internet application (database, GIS) design and development
- Web page, domain name hosting (i.e., www.yoursite.com)
- Intranet (private Internet) services

CRA provides our clients with website, database management, and GIS solutions on the Internet using industry-leading technologies such as MapObjects□, Internet Map Server□, Microsoft IIS□, Microsoft Access□, HTML, Java, and Active Server Pages (ASP).

2.5 OTHER SUPPORT SERVICES

2.5.1 GROUNDWATER RESOURCES/HYDROGEOLOGY

Groundwater resources and hydrogeology services have been a primary area of expertise for CRA for over a quarter century. These services are provided directly to clients involved in water supply projects, and as support services to other CRA engineering and environmental projects. CRA's hydrologists, hydrogeologists, and geologists provide expertise in both contaminant and water supply hydrogeology. CRA's groundwater resource/hydrogeology services include:

- Hydrogeologic formation characterization and testing
- Water supply master planning
- Design of extraction and injection systems
- Pumping station and storage reservoir design
- Design of groundwater monitoring networks
- Design of hydraulic containment systems
- Design of in situ treatment systems
- Groundwater flow and contaminant transport modeling
- Evaluation of intrinsic remediation/natural attenuation
- Ecological/wetland assessments and mitigation plans
- Regulatory compliance and permitting assistance
- Geophysical assessments
- Cost allocation based on fate and transport quantification

2.5.2 RISK ASSESSMENT

The successful resolution of environmental issues while operating a profitable business is a management challenge in today's business world. The key is understanding the

impacts of chemicals in the environment on human health and ecological resources. Human health risk and ecological risk assessments are used in the risk management process to determine if remedial action is necessary to protect public health and the environment. The use of risk assessment in the risk management process allows industry to focus available funds on the most critical problems.

CRA has offered risk assessment services for more than 25 years, applying "good science" techniques of reasonable exposure assumptions and applicable toxicological effects. CRA has developed expertise in the areas of environmental toxicology and risk assessment and has substantial experience in dealing with proposed and promulgated risk assessment regulations throughout North America. CRA's objective is always to achieve a balance between reasonable, practical solutions to environmental problems involving issues of risk and the requirements of the relevant agencies. CRA's specialists have extensive experience in the following areas:

- Baseline human health risk assessment under various environmental program requirements
- Chemical fate and transport evaluation and modeling
- Exposure and toxicity assessments
- Development of Conceptual Site Models (CSMs)
- Determination of alternative, risk-based cleanup criteria
- Development of and petitions for Alternate Concentration Limits (ACLs)
- Ecological risk assessments
- Endangered species and critical habitat evaluations
- Coastal zone permitting
- Risk-based closure analysis
- Natural Resource Damage Assessment (NRDA) claim expertise
- Wetlands delineation and jurisdictional determinations

2.5.3 INNOVATIVE TECHNOLOGIES

CRA's Innovative Technology Group consists of a core group of members dedicated to identification, evaluation, and application of innovative approaches for the remediation of chemical contamination. The goal of the group is to assist in reducing overall site remediation costs through the identification, assessment, and implementation of viable technologies with a focus on in situ technologies.

The Innovative Technology Group assists CRA Project Managers in the review and recommendation of innovative approaches for site remediation. The group has specialized laboratory facilities for chemical analyses and handling of toxic and hazardous materials, clean rooms for organism isolation and fermentation, and scale-up facilities for treatment system assembly, process development, and testing. These facilities are used for the performance of a variety of treatability studies as well as the development and housing of specialized mobile equipment for biological treatment, soil vapor extraction, air stripping, and activated carbon treatment.

2.5.4 SURFACE WATER RESOURCES

CRA provides expertise in all areas of surface water resource services. Due to the diversity of our ecosystem, surface water resource applications span a wide spectrum of technical areas. Virtually every environmental, civil, and municipal undertaking involves water resources engineering to some degree.

CRA surface water resource services include:

- Hydrologic and hydraulic modeling
- Watershed/subwatershed management and planning
- Design of stormwater management and conveyance systems
- Floodplain mapping and field surveys
- Shoreline erosion and flood control
- Stream/lake water quality assessment and improvements
- Assimilative capacity studies
- Wetland mitigation plans

3.0 CORPORATE QUALITY ASSURANCE/QUALITY CONTROL

CRA firmly believes that corporate quality assurance/quality control is essential to delivering the consistent quality service expected by our clients. CRA's quality commitment to our clients is reflected in our Quality System Policy statement, which reads:

> *We will continually improve the quality of our services through a Quality Management System and the ongoing training of our employees.*
>
> *Our objective on all projects is to exceed client expectations by providing responsive, safe, and cost-effective services.*

CRA is registered under the ISO 9001:2008 international standard in Consulting, Engineering, and Design Services. There are 41 CRA locations where our Quality Management System is registered.

CRA's success at meeting and exceeding clients' needs is evidenced by the high percentage of repeat business that CRA has experienced and the results of client feedback questionnaires. The following is a summary of results of client feedback received to date under our ISO 9001:2008 Quality System Program.

Responsiveness	97%	Excellent or Good
Overall Performance	97%	Excellent or Good
Client Expectations	97%	Met or Exceeded

REGISTERED COMPANY FOR ISO 9001 ENGINEERING DESIGN

In addition to our ISO 9001:2008 Quality Management System, CRA has developed and implemented extensive in-house training programs to ensure quality and consistency across the organization. These programs include project management training, standard operating procedures for all field-related activities, health and safety training, and contract specification preparation, along with frequent seminars and presentations regarding laws, regulations, and new technologies.

4.0 HEALTH AND SAFETY

CRA understands that our employees are the company's most valuable resource and that they deserve the right to practice their profession in a safe working environment. Safety ranks as the highest priority of commitment by CRA's senior management.

CRA's health and safety program is called **S**afety **M**eans **A**wareness **R**esponsibility **T**eamwork (**SMART**). The **SMART** program was developed to provide the foundation for continuous improvement in our safety performance and serve as a vehicle by which we sustain the importance of health and safety management in our daily activities. Our goal with respect to safety performance is for each employee to consider safety a service that we provide to our clients. Our corporate record for safety is something we are proud of, recognizing that there is always room for improvement.

Year	*Experience Modification Rate (EMR)*	*OSHA Recordable Incident Rate (TRIR)*	
2011	0.79	0.22	
2010	0.75	0.34	
2009	0.80	0.43	
2008	0.77	0.46	
2007	0.76	0.82	
We are proud to have never experienced a work place fatality			

Health and safety procedures are addressed and outlined in CRA's ISO 9001:2008 Quality System (QS) and in our corporate health and safety program. CRA strives to provide a sound and minimal risk work environment for each employee through the prevention of accidents, occupational illness, and injuries. CRA prepares a site-specific Health and Safety Plan (HASP) for every site at which CRA is working and field staff have potential airborne and/or chemical exposures that may exceed published occupational exposure values.

All CRA employees are required to complete a training matrix form on which their supervisor can identify all of the specific job function training, QS training, and health and safety training that they will be required to complete. This training matrix is reviewed and updated annually as part of each employee's performance review. Once the supervisor has identified all training that will be required, the supervisor then arranges for the employee to receive the training. This training may include courses that can be delivered live by our own internal staff, by a qualified external trainer, or online.

5.0 CORPORATE EXPERIENCE

Since 1976, CRA has worked on over 50,000 assignments throughout North America, as well as internationally in over 60 countries. The scope of our experience ranges from small, single-discipline projects to complex, multi-million-dollar design-build projects.

CRA's clients have included hundreds of individual and multi-site commercial and industrial companies, an impressive group of Fortune 500 corporations, the legal profession, public utilities, regulated branches of governments, and the World Bank, as well as countless towns, cities, and municipalities. Within CRA's environmental work, our focus has primarily been on working for the industrial/commercial market (i.e., the regulated community) rather than the regulators. We have also provided a broad range of engineering services for numerous small, medium, and large municipalities, as well as private developers and builders.

CRA has historically experienced very low turnover rates, especially among senior professional staff. This has been a key factor in CRA's success over the years. With our low turnover rate, the continuity of our senior staff permits a long-term view on ongoing projects and allows for effective mentoring and development of junior and intermediate staff by the Principals, Associates, and other senior professionals in the firm.

A selected list of projects that are representative of the broad scope of professional services completed and/or ongoing by CRA is presented in Table 5.1.

6.0 OFFICE LOCATIONS

WE BRING OUR EXPERTISE TO YOU - CRA's seamless organizational structure enables us to offer the expertise of personnel in any office or member of the CRA Family of Companies to any project, regardless of location.

ARGENTINA	
Buenos Aires	**Buenos Aires**
BRASIL	
Amazonas	**Manaus**
Pará	**Belém**
Rio de Janeiro	**Rio de Janeiro**
São Paulo	**São Paulo**
CANADA	
Alberta	**Calgary, Fort McMurray**
British Columbia	**Vancouver**
New Brunswick	**Fredericton**
Newfoundland & Labrador	**St. John's**
Nova Scotia	**Halifax, Sydney**
Ontario	**Kingston, Mississauga, Newmarket, Ottawa, Peterborough, Sault Ste. Marie, St. Catharines, Toronto, Waterloo, Windsor**
Québec	**Brossard, Gatineau, Montréal, Québec City, Rimouski, Saguenay, Trois-Rivières**
COLOMBIA	
Cundinamarca	**Bogotá**
MEXICO	
Nuevo León	**Monterrey**
UNITED KINGDOM	
England	**Liverpool, Nottingham**
UNITED STATES	
Alabama	**Mobile**
Arizona	**Phoenix, Tucson**
Arkansas	**Little Rock**
California	**Emeryville, Eureka, Fresno, Irvine, Rancho Cordova, Sonoma, Stockton**
Colorado	**Golden**
Connecticut	**Hartford**
Florida	**Fort Myers, Orlando, Pensacola, Tampa, West Palm Beach**
Georgia	**Atlanta, Savannah**
Idaho	**Soda Springs**
Illinois	**Chicago, Springfield**
Indiana	**Indianapolis**
Kansas	**Overland Park, Topeka, Wichita**
Kentucky	**Lexington**
Louisiana	**Baton Rouge, Shreveport**
Massachusetts	**Boston**
Michigan	**Detroit, Plainwell**
Minnesota	**St. Paul**
Missouri	**St. Louis**
Montana	**Bozeman**
Nebraska	**North Platte, Omaha**
New Jersey	**Edison**
New Mexico	**Albuquerque, Bloomfield**
New York	**Buffalo, Niagara Falls, Rochester, Syracuse**
North Carolina	**Charlotte**
Ohio	**Cincinnati, Sandusky**
Oklahoma	**Oklahoma City, Tulsa**
Pennsylvania	**Philadelphia, Pittsburgh**
South Carolina	**Charleston, Hilton Head**
Tennessee	**Nashville**
Texas	**Austin, Corpus Christi, Dallas, Houston, Kingsville, Midland**
Washington	**Seattle, Tacoma**
Wisconsin	**Green Bay**

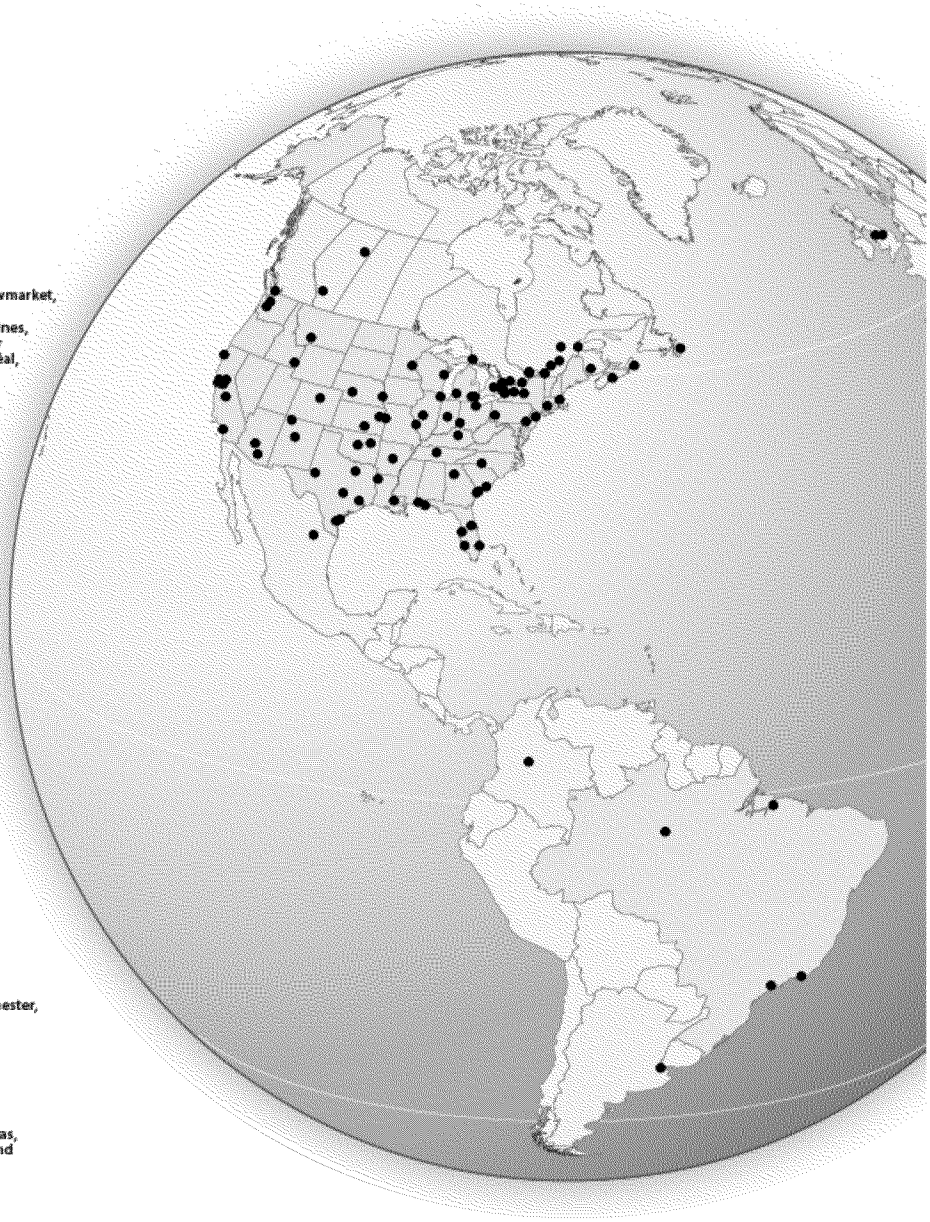

TABLE 5.1

SELECTED CRA PROJECT EXPERIENCE

Work Description	*Location of Work*	*Owner or Client*
Engineering, Hydrogeologic Services, Landfill Design Approval Process, Operation and Maintenance Inspection / Reporting, Interim Expansion Engineering and Approvals, Environmental Assessment (EA) Process for Expansion	Landfill Site London, ON	Green Lane Landfill (formerly St. Thomas Sanitary Collection)
Field Investigation and Reporting, Conceptual and Final Design, Specification Writing, Field Supervision of Remedial Action	Love Canal (Landfill) Niagara Falls, NY	City of Niagara Falls
Conducted Phase I Environmental Assessments on 80 industrial and commercial properties. Followed up by Phase II studies.	Montreal, Quebec City and Sherbrooke, PQ	Société Immobilière Trans-Québec Inc. (SITQ)
Remedial Investigation / Feasibility Study, Design of Remedial Measures, Management of Remedial Construction at Landfill and Adjacent Surface Water Bodies, and 550 gpm Groundwater Collection and Treatment System	Landfill Hardeman County, TN	Velsicol Chemical Corporation
Design and Project Management of Remedial Cleanup	Chemical Tank Train Derailment Mississauga, ON	City of Mississauga and Regional Municipality of Peel
Field Investigation, Conceptual and Final Design, Field Supervision of Remedial Action, RCRA B Permit, Groundwater Protection Plan, Post-Closure Monitoring	Industrial Waste Landfill Fridley, MN	FMC Corporation
Geotechnical investigations and environmental characterization. Conducted inspection, testing, and supervision for the placement of foundations, backfilling and compaction, concrete, asphalt, environmental clean-up, roofing, and waterproofing membranes.	CASINO de Montréal Expo '67 Fairgrounds Montreal, PQ	Casiloc Inc.

TABLE 5.1

SELECTED CRA PROJECT EXPERIENCE

Work Description	*Location of Work*	*Owner or Client*
Design and installation of major modification to phenolic resin and molding compound production lines to expand product range. Major equipment items from a sister plant were refurbished and used to minimize cost and meet schedule.	Fort Erie, ON	Durez Products
Hydrogeologic Investigation, Remedial Investigation, Remedial Design, Supervision of Remedial Construction (PCB Contamination in Creek Sediments and Plant Facility)	Manufacturing Facility London, ON	Westinghouse Canada Inc.
Hydrogeologic Review, Alternative Landfill Design, Leachate Control and Treatment, Environmental Impact Assessment	100-acre Landfill Site Sarnia, ON	City of Sarnia
Hydrogeologic Investigation, Design, Evaluation of Remedial Action Alternatives, RCRA Part B Permit Remedial Design (Barrier Wall and Groundwater Containment System), Remedial Construction Supervision, Sewer Rehabilitation Design	Manufacturing Facility Rotterdam Junction, NY	Schenectady International Inc.
Hydrogeologic Investigation, Environmental Assessment, Landfill Design, Performance Monitoring, Landfill Gas and Leachate Management	175-acre Landfill Site Waterloo, ON	Regional Municipality of Waterloo
Evaluation of Hydrogeologic Study and Review of Analytical Database (Pentachlorophenol Spill)	Penticton, BC	Greenwood Forest Products
Remedial Investigation / Feasibility Study, Interim Response Action, Regulatory Negotiations	Former Coal Gasification Plant Minneapolis, MN	Minnegasco

TABLE 5.1

SELECTED CRA PROJECT EXPERIENCE

Work Description	*Location of Work*	*Owner or Client*
Special Master to US Federal Court to Manage, Design and Administer Cleanup and Disposal of Drummed and Tanked Hazardous Wastes, Recovery of Commercial Products, and Demolition of Facility	Former Oil Refinery East Chicago, IN	U.S. Federal Court Re: Energy Cooperative Inc.
Design / build a 3rd Stage Chiller to liquefy chlorine; eliminating the use of carbon tetrachloride in the manufacturing process.	Muscle Shoals, AL	Occidental Chemical
Carried out geotechnical investigations and studied methods of repair and reconstruction of heavy duty pavements associated with mobile gantry cranes and storage areas for stacks of containers. Supplied inspection services during reconstruction	Port of Montreal (Piers 46 and 47) Montreal, PQ	Port of Montreal
Trout Lake Watershed Management Study	North Bay, ON	North Bay / Mattawa Conservation Authority
Operations & Maintenance of SVE System for removal of PCE, TCE, vinyl chloride, and other constituents.	Gardena, CA	Hitco Carbon Composites
Municipal Water Treatment Plant (Well Water) Design and Construction Oversight - 80,000-gpd capacity	Embro, ON	Zorra Public Utilities Commission
Landfill Gas Utilization Review, Field Testing Program, Gas Collection System Design, Construction Supervision	Upper Ottawa Street Landfill Hamilton, ON	Regional Municipality of Hamilton-Wentworth
Remedial Investigation / Feasibility Study and Risk Assessment Critique, Remedial Design / Remedial Action, Vadose Zone Treatability Study, Negotiation of Consent Decree, Vadose Zone Modeling	Hassayampa Landfill Maricopa County, AZ	PRP Group

TABLE 5.1

SELECTED CRA PROJECT EXPERIENCE

Work Description	*Location of Work*	*Owner or Client*
Design, Implementation of Bioremediation for Oil Tar Wastes	Former Coal Gasification Plant Port Stanley, ON	Ultramar Canada
Quality control of earthwork, concrete and asphalt during overhauling and waterproofing of concrete slabs, new parapets and piers, and placement of new asphalt on expressways	Metropolitan and Decarie Expressways Montreal, PQ	Transport Quebec
Environmental Assessment, Site Investigations, Design of Remedial Measures, Supervision of Remedial Construction for over 300 Manufacturing and Retail Facilities	Across North America	J.I. Case Company
Design of Elevated Water Storage Tank With a Volume of 500,000 gallons	Dorchester, ON	North Dorchester P.U.C.
Site Investigation, Design, Construction, Supervision of Waste Containment Facility, Groundwater Modeling, Design and Construction of Groundwater Collection and Treatment (Ultraviolet-Oxidation) Systems, Buried Waste Remedial Plan, Surface Water Modeling, Biomonitoring	Manufacturing Facility Elmira, ON	Chemtura (Formerly Uniroyal Chemical Ltd.)
Development of Site Work Plan and Implementation of Waste Characterization, Consolidation / Disposal Program for Tanked / Drummed Waste	Fisher-Calo Site Kingsbury, IN	Fisher-Calo Steering Committee
Major retrofit consisting of replacement of switchgear, modification of utility power line, take-off structure harmonic filters, transformer, rectifier assembly, remote control panel, auxiliary systems and modification of existing busbar system.	Delaware City, DE	Occidental Chemical Corporation

TABLE 5.1

SELECTED CRA PROJECT EXPERIENCE

Work Description	*Location of Work*	*Owner or Client*
Site characterization along 12 km (7 miles) of three major regional open storm drainage water courses. The Quebec government considered them to be abandoned waste disposal sites	Dorval, Pointe-Claire and Pierrefonds, PQ	Ministry of Environment of Quebec (MENVIQ)
Retail Petroleum UST Site Portfolio Management for over 200 sites in California. Management of fixed fee to closure sites with UST Fund preapproval for unit cost milestone payments. CRA has successfully closed 100 sites in past 5 years by negotiation with local oversight agencies for low risk closure pathways.	Various locations, CA	Chevron EMC
Project Management of Asbestos Decontamination, Partial Demolition including PCB Decommissioning	Asbestos Products Manufacturing Complex Manville, NJ	Manville Sales Corporation
Site Investigation of Pentachlorophenol Contamination, Remedial Design	Lumby, BC	Bell Pole Company Limited
Remedial Investigation / Feasibility Study Review, Remedial Design / Remedial Action Work Plan, Hydrogeologic Investigations, Monitoring, Drum Removal (25,000 drums), Remedial Design, Reporting	Metamora Landfill Site Lapeer County, MI	PRP Group
Review of Melitzer Creek Watershed Natural Environmental Features; Watershed Hydrogeologic Flow Model; Analysis of Development Impact on Existing Wetlands and Cold Water Stream; and Stream Base Flow and Water Quality Augmentation Methods	Waterloo, ON	City of Waterloo

TABLE 5.1

SELECTED CRA PROJECT EXPERIENCE

Work Description	*Location of Work*	*Owner or Client*
Site Servicing Development and Evaluation Plan for a Proposed Industrial Subdivision	Bruce County, ON	Canadian AGRA
Geometric Design, Intersection Improvements, Final Design Drawings and Contract Document Preparation, Construction Oversight and Contract Administration for 2 km Roadway Reconstruction Drainage Improvements, and Widening	Fisher-Hallman Road Kitchener / Waterloo, ON	Regional Municipality of Waterloo
Feasibility Study, Remedial Design / Remedial Action, Vadose Zone Treatability Study, Negotiation of Consent Decree, Soil Removal	Tucson International Airport NPL Site Tucson, AZ	PRP Group
Design / Build of a Communal Water Treatment System, Consisting of Aeration and Filtration and Storage Reservoir. Average Flow 100,000 gpd	Woolwich, ON	Village Development Ltd.
Hydrogeologic investigation, bench-scale testing and feasibility study, and remedial design for pesticides and fertilizers in soil and groundwater	Dos Palos, CA	Crop Production Services, Inc.
Design of 1,800 m of 450 mm Diameter Trunk Sewer, Including a Section Constructed Within an Existing Box Tunnel and a Section Within the Bedrock of the Thames River	Trunk Sewer St. Marys, ON	Town of St. Marys
Comprehensive Air Emissions Inventory; Review of Applicable Federal and State requirements; and, Title V Operating Permit Strategies	Phenolic Resin Plant Kenton, OH	Occidental Chemical Corporation

TABLE 5.1

SELECTED CRA PROJECT EXPERIENCE

Work Description	*Location of Work*	*Owner or Client*
Phase I / II Site Assessment, Prepare Work Plan under Indiana Voluntary Remediation Program, Remediation Oversight / Reporting (Received Certificate of Completion and Covenant Not to Sue)	Manufacturing Facility Berne, IN	Masco Corporation
Design and installation of control systems at multiple sites allowing remote operation of all sites from one location thus reducing manpower requirements.	Niagara Falls, NY	Glenn Springs Holdings, Inc.
Roadway Flooding Cause Investigation; Alternative Remedial Designs; Public Participation Program; and Recommendations for Preferred Alternative	Village of Ayr ON	Township of North Dumfries
Development of Remedial Action Plan for the Relocation of a Closed Municipal Landfill Containing 200,000 Tonnes of Mixed Solid Waste. Excavation, Hauling Protocols, Health and Safety Plan Development, Agency and Public Consultation and Site Closure Reporting	Brock North Landfill Pickering, ON	Municipality of Metropolitan Toronto
Water Quality Audits of Sample Collection Techniques for EAA Surface Water Pump Facilities	South Florida	South Florida Water Management District
Hydrogeologic Evaluation, Development of Final Design and Operation Plan, Design of Long-Term Monitoring Program, Implementation of Long-Term Monitoring Program	Millstream Landfill, Victoria, BC	Highwest Recycler Ltd.

TABLE 5.1

SELECTED CRA PROJECT EXPERIENCE

Work Description	*Location of Work*	*Owner or Client*
Inspection, testing and supervision of: excavation, blasting, and pile-driving operations; concrete mixes and placement operations; backfill materials, placement, and compaction; structural steel assembly and erection; placement of reinforcing steel bars; placement of roofing and water-proofing membranes; installation of granite panels and anchors; and preparation of quality assurance manual.	United States Embassy Ottawa, ON	Axor Group Inc.
Indoor Air Quality Monitoring	Langley, BC	Canada Trust
Hydrogeologic investigation, remediation of nitrates in soil through excavation and agronomic application, and regulatory negotiation leading to closure for former fertilizer bulk distribution facility	Esparto, CA	John Deterding Company, Inc.

CONESTOGA-ROVERS & ASSOCIATES

QUALITY SYSTEM OVERVIEW

CONESTOGA-ROVERS & ASSOCIATES
QUALITY SYSTEM OVERVIEW

SCOPE:

The Quality System of Conestoga-Rovers & Associates (CRA) is registered to, and is in conformance with all the requirements of the ISO 9001:2008 International Standard, covering consulting, engineering, and design services at the following locations:

Atlanta, Georgia
Baton Rouge, Louisiana
Buffalo, New York
Calgary, Alberta
Charles City, Iowa
Charlotte, North Carolina
Chicago, Illinois
Cincinnati, Ohio
Detroit, Michigan
Houston, Texas
Indianapolis, Indiana
Lansing, Michigan
Montreal, Québec
Nashville, Tennessee
Niagara Falls, New York
Ottawa, Ontario
Philadelphia, Pennsylvania
Phoenix, Arizona
Pittsburgh, Pennsylvania
Plainville, Connecticut
Sandusky, Ohio
Sault Ste. Marie, Ontario
Shreveport, Louisiana
St. Catharines, Ontario
St. Paul, Minnesota
Stockton, California
Toronto West, Ontario
Toronto East, Ontario
Vancouver, British Columbia
Waterloo, Ontario (all 6 locations)
Windsor, Ontario

QUALITY SYSTEM POLICY STATEMENT:

We will continually improve the quality of our services through the implementation of a Quality Management System and ongoing training of our employees. Our objective on all projects is to meet and exceed the expectations of our Clients providing quality services in a responsive, safe, and cost-effective manner.

Edward S. Roberts, President

Gregory R. Brooks, Principal-in-Charge of the Quality System

CONESTOGA-ROVERS & ASSOCIATES
QUALITY SYSTEM OVERVIEW

OBJECTIVES:

CRA's top management, the Executive Committee, defines our corporate quality objectives, and considers both CRA's client and business requirements when developing these objectives. CRA's quality objectives are framed by the Quality System Policy Statement.

Objectives are communicated to CRA employees through correspondence delivered by CRA's President, ongoing training, annual reports, newsletters, and the company intranet website.

PROCEDURES:

The following sections provide a brief overview of the Quality System Procedures Manual. This information includes a description of the requirements for each section and a general overview of CRA's approach to addressing these requirements.

SECTION 4 - QUALITY SYSTEM, DOCUMENT CONTROL, AND QUALITY RECORDS

CRA is required to develop and implement a Quality Management System. This section of the manual identifies CRA's documented process for monitoring, measuring, analyzing, and improving our Quality System.

Internal Control Documents are those generated internally by CRA and affect the quality of CRA's work (i.e., Quality System Procedures Manual, Field Training Manual). It is a requirement of the Quality System that Internal Control Documents are identified and maintained, such that CRA can easily refer to the most current copies of these documents. To manage these documents, CRA will use electronic media to ensure that the most current versions of all documents are being used. Reference documents, such as regulations, guidelines, and standards, that are used in the provision of Professional Services are defined as External Control Documents, and are required to be current and up-to-date.

Referencing External Control Documents will vary by office location (for example, provincial and state environmental regulations); therefore, each individual is responsible for ensuring the most current External Control Documents referenced are used for project work.

CRA's Quality System requires quality records to be identified and filed. Quality records are those documents used to demonstrate that CRA followed the procedures contained in the Quality System Procedures Manual. (For example, CRA-client contracts, purchase orders for vendors, etc.) CRA forms and other data generated during completion of a project meet this requirement. These forms and data are generally filed in the project file.

SECTION 5 - MANAGEMENT RESPONSIBILITY

A strong commitment from senior management of the company is required for the development and implementation of the Quality System. This section of the manual identifies key positions such as the Principal-in-Charge of the Quality System, the Quality System Manager, and CRA's top management, the Executive Committee. This section also contains procedures for management review of the Quality System, reporting to CRA's Executive Committee, and modification of the Quality System, if required.

SECTION 6 - HUMAN RESOURCES AND INFRASTRUCTURE

CRA is required to periodically review the competency of its employees and provide adequate training to personnel when required. In this section of the Quality System Procedures Manual, CRA documents training programs that are available in-house, and maintains a database to track those employees who have completed the various training programs. The need for additional training will be reviewed during the annual employee reviews conducted in October/November of every year.

Management will also ensure sufficient resources are provided to employees, such as office supplies and a secure workplace, in order to meet our client requirements.

SECTION 7 - PROFESSIONAL SERVICES

CRA's contractual arrangements with clients are expected to be fully documented in a manner that clearly outlines the client's requirements on every project. This section of the Quality System captures CRA's existing methods for establishing and reviewing Professional Services Agreements. Documentation of all CRA-client contracts is to be forwarded to the Contracts file in Waterloo.

Several steps are to be taken during the completion of a project to ensure that client requirements are being met. Generally speaking, these steps include selection of appropriate trained project staff, assignment of a Project Manager, assignment of a project number, communication of the project requirements and project changes amongst the project team, interim review of Deliverables, and final review of all Deliverables prior to issue.

Goods or services that may affect quality are expected to meet client requirements and CRA requirements for quality. CRA staff evaluate vendors to ensure that they meet the project requirements and that these reviews are completed each time CRA hires a vendor or purchases goods. To make this process more efficient, CRA has developed a procedure for using Master Agreements for those vendors which CRA frequently uses. If a Master Agreement exists or if the vendor shows full approval status on the Approved Vendor list, then staff know this vendor has been qualified to meet CRA requirements. A simple purchase order (or equivalent) is used to describe the goods and services required for the project.

Any client-supplied information or product must be reviewed to ensure that it meets the project requirements. If any information or data provided by the client is reviewed and is not acceptable, the client is notified. Notification to the client must be written and filed.

All project-related materials must be identified and traceable to the originator. Our current filing system and project identification system meet these ISO 9001 requirements. Any information in the project files must include a project number, a date, and be traceable to the originator. This means that any design calculations, handwritten notes, records of telephone conversations, etc. need to clearly indicate the originator.

Inspection, measurement, and test equipment that generates data for use in the provision of Professional Services must be controlled in a manner such that the data generated is appropriate and valid. CRA has implemented a more formal procedure for the maintenance and calibration of field equipment and recording that these calibration and maintenance activities are completed. Maintenance and calibration activities done in the shop (i.e., at CRA offices) are to be done under the direction of a Field Equipment Manager and recorded in files maintained by the Field Equipment Manager. Calibration activities completed in the field are to be documented by the equipment user, with this information sent to the project file. All field equipment will be equipped with a label that indicates its current calibration status, and the date when the next calibration or maintenance is to be completed. CRA staff are not to use equipment that has not been calibrated or maintained as required.

CRA's Deliverables are to be submitted in an appropriate fashion. CRA's current practices for submission of Deliverables adhere to Quality Management System requirements, so few procedures are contained in this section. A record is maintained of every submittal to a client or other agency. A transmittal form, fax cover sheet, e-mail record, or a cover letter can be used. Copies of these documents must be sent to file.

SECTION 8 - PROFESSIONAL SERVICES AND QUALITY SYSTEM IMPROVEMENT

CRA is expected to follow specific procedures if services provided by CRA do not conform to client requirements, or if a specific procedure in the Quality System is

not followed. This is a sensitive area that needs to be managed well in order to be effective. When problems arise on projects, they should be identified so that corrective actions can be clearly developed and implemented. This process is intended to improve the quality of CRA's services; usually, short-term actions resolve the identified issue. CRA staff identifying potential nonconforming services should discuss these situations with the Project Manager, and, as appropriate, the Quality System Manager, in order to ensure that these issues are dealt with appropriately and consistently across the company. Quality System Nonconformances are primarily identified during an internal audit; however, any CRA employee can identify a Quality System Nonconformance to the Quality System Manager.

Corrective and preventive actions are to be taken when required. This section addresses both Nonconformances to the Quality System and project-related Nonconformances. Generally speaking, any CRA staff member can suggest a change, improvement, or preventive action to be incorporated into the Quality System. This suggestion should be addressed to the Quality System Manager/Principal-in-Charge of the Quality System, who will evaluate the suggested change. If changes are deemed necessary or appropriate, they will be incorporated into the Quality System. All staff are encouraged to find better ways to meet the objectives of the Quality Management System.

Internal audits are periodically conducted to ensure that CRA's operations conform to the Quality System. CRA has trained many people within the company to undertake these internal audits. The internal audits are intended as a checking mechanism to ensure that CRA is following its policies and procedures. This auditing function is intended to be undertaken in a constructive fashion to help identify where difficulties are arising within the Quality System.

WORK INSTRUCTIONS

Seven work instructions have been prepared, which form part of the Quality Management System. A brief description of these work instructions is provided below:

Design Services Work Instructions

This work instruction applies to projects involving Design Services. These procedures apply to engineering design projects intended to form the basis of construction documents, and/or when Construction Contract Administration Services are provided by CRA. The Design Services group is headed by the Principal-in-Charge of Design Services.

Master Agreement Work Instructions

This work instruction applies to the establishment of Master Agreements with subcontractors and suppliers.

Inspection, Measurement, and Test Equipment Work Instructions

This work instruction details procedures to be followed by the Field Equipment Manager at each CRA office. These procedures pertain to the maintenance and calibration of field equipment that is used by CRA to generate data for use on projects. The Field Equipment Manager at each CRA office will be trained with respect to the requirements of this work instruction.

Filing of Project-Related Material Work Instructions

This work instruction outlines the filing procedures used by CRA to control project-related materials such as correspondence, field data, reports, etc. All CRA employees are expected to follow in this work instruction.

Internal Quality System Auditing Work Instructions

This work instruction provides procedures to be followed by CRA internal auditors in auditing the Quality System. These procedures document the frequency of internal audits as well as a reporting mechanism for summarizing internal Quality System audit results.

Client Feedback Questionnaire Work Instructions

This work instruction outlines the process for soliciting client feedback as a means of measuring client satisfaction with CRA's Professional Services. It details the procedure to be followed by our Client Feedback Questionnaire Committee, which is made up of three Associates who serve a minimum 2-year term.

CONESTOGA-ROVERS & ASSOCIATES
QUALITY SYSTEM OVERVIEW

Analysis of Data Work Instructions

This work instruction outlines the process for gathering and analyzing data generated at CRA, as a means of identifying trends or areas of improvement for CRA's Quality System. CRA's Quality System Group will assess Quality System data such as returned Client Feedback Questionnaires, Project Nonconforming Services Reports, and Internal Quality System Audit Reports.

As required by the ISO 9001:2008 International Standard, the following mandatory documentation is included in the Quality System Procedures Manual:

1. Document Control
2. Record Control
3. Control of Nonconformances
4. Corrective Action
5. Preventive Action
6. Internal Audit

QUALITY MANAGEMENT SYSTEM PROCESS:

A complete system overview of CRA's quality process, from initial contact with a client to final product delivery, is detailed in the attached flowchart.

QUALITY MANAGEMENT SYSTEM OVERVIEW

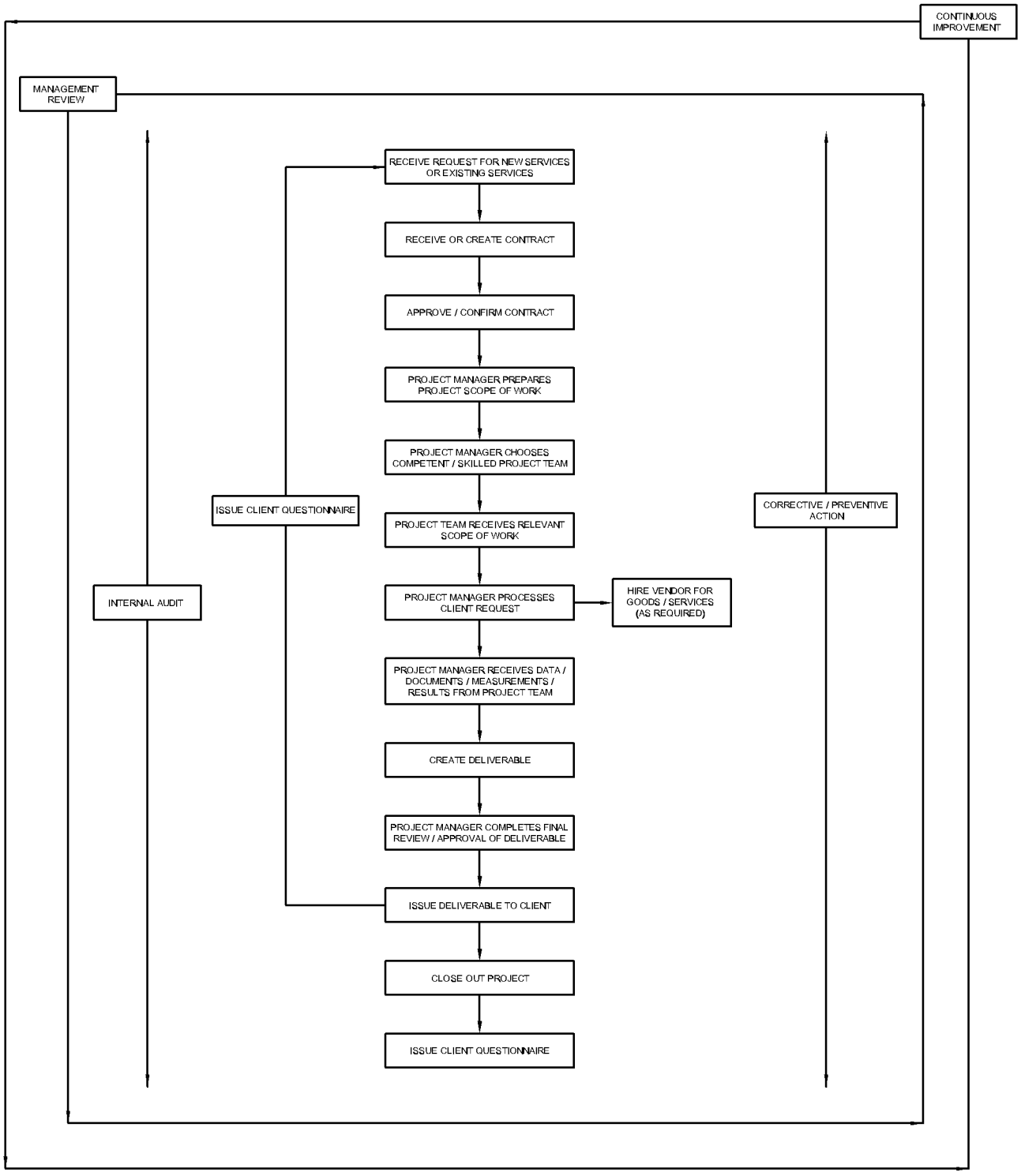

figure 1.1

QUALITY MANAGEMENT SYSTEM OVERVIEW